

WHAT WE CLAIM ARE:

1. A method of manufacturing a semiconductor light emitting device,
comprising the steps of:
 - (a) preparing a first substrate;
 - 5 (b) forming a ball-up preventive layer on said first substrate;
 - (c) forming a bonding layer made of eutectic material on said ball-up preventive layer to obtain a support substrate;
 - (d) preparing a second substrate;
 - (e) forming a semiconductor light emitting structure on said second
10 substrate;
 - (f) forming a first electrode in at least a partial surface area of said semiconductor light emitting structure;
 - (g) forming a barrier layer on a surface including an upper surface of said first electrode;
 - 15 (h) forming a metal layer on said barrier layer to obtain a device substrate;
 - (i) bonding together said bonding layer of said support substrate and said metal layer of said device substrate to obtain a bonded structure;
 - (j) removing said second substrate from said bonded structure; and
20 (k) forming a second electrode in a partial surface area of said semiconductor light emitting structure exposed on a surface of said bonded structure at said step (j) to obtain the semiconductor light emitting device,
wherein:
in said step (i), eutectic material of said bonding layer forms
25 eutectic with said metal layer to bond together said support substrate and said

device substrate;

said ball-up preventive layer prevents ball-up of said bonding layer;

and

said barrier layer prevents a composition of a material of said first

5 electrode from diffusing into said barrier layer and prevents the eutectic material of said bonding layer from intruding into said first electrode.

2. The method of manufacturing a semiconductor light emitting device according to claim 1, wherein in said step (a), said first substrate is a Si substrate
10 doped with n- or p-type impurities.

3. The method of manufacturing a semiconductor light emitting device according to claim 1, wherein said step (a) comprises:
(l) preparing a conductive substrate; and
15 (m) alloying Au on at least one surface of said conductive substrate.

4. The method of manufacturing a semiconductor light emitting device according to claim 1, wherein said step (b) comprises:
(n) forming a layer having high adhesion with said first substrate on
20 said first substrate; and
(p) forming a layer for improving wettability of a layer to be formed thereon on said layer having high adhesion with said first substrate.

5. A method of manufacturing a semiconductor light emitting device according
25 to claim 1, wherein said step (b) comprises:

- (q) forming a Ti layer on said first substrate; and
- (r) forming an Ni layer on said Ti layer.

6. The method of manufacturing a semiconductor light emitting device
5 according to claim 1, wherein said step (g) comprises:

- (s) forming a first barrier layer on said first electrode, said first barrier layer preventing diffusion of a composition of a material constituting said first electrode; and

- (t) forming a second barrier layer on a surface including an upper
10 surface of said first barrier layer, said second barrier layer preventing the eutectic material of said bonding layer from intruding into said first electrode.

7. The method of manufacturing a semiconductor light emitting device
15 according to claim 6, wherein said first barrier layer is made of Ti-W-nitride and said second barrier layer is made of an Al/Ta lamination, an Al/Mo lamination or an Al/W lamination.

8. The method of manufacturing a semiconductor light emitting device
20 according to claim 6, wherein said step (g) further comprises after said step (s) a step of:

- (u) patterning said first barrier layer and said first electrode in a same shape.

25 9. The method of manufacturing a semiconductor light emitting device

according to claim 8, wherein said second barrier layer has a higher reflectance than a reflectance of said first electrode, relative to light emitted from said semiconductor light emitting structure.

- 5 10. The method of manufacturing a semiconductor light emitting device according to claim 9, wherein said second barrier layer includes an Al layer in contact with said semiconductor light emitting structure.

11. A semiconductor light emitting device comprising:

- 10 a substrate;
a ball-up preventive layer formed on said substrate;
a bonding layer made of eutectic material and formed on said ball-up preventive layer;
a metal layer formed on said bonding layer;
15 a barrier layer formed on said metal layer;
a first electrode formed on or in parallel with said barrier layer;
a semiconductor light emitting structure formed on a surface including an upper surface of said first electrode; and
a second electrode formed on a partial surface of said
20 semiconductor light emitting structure,
wherein:
eutectic material of said bonding layer forms eutectic with said metal layer to bond together said bonding layer and said metal layer;
said ball-up preventive layer prevents ball-up of said bonding layer;
25 and

said barrier layer prevents a composition of a material of said first electrode from diffusing into said barrier layer and prevents the eutectic material of said bonding layer from intruding into said first electrode.

5 12. The semiconductor light emitting device according to claim 11, wherein said substrate is formed of a Si substrate doped with n- or p-type impurities.

13. The semiconductor light emitting device according to claim 11, wherein said substrate comprises a conductive substrate, and an Au layer alloyed with at
10 least one surface of said conductive substrate.

14. The semiconductor light emitting device according to claim 11, wherein said ball-up preventive layer comprises a layer having high adhesion with said substrate and formed on said substrate, and a layer for improving wettability of
15 said bonding layer formed on said layer having high adhesion with said substrate.

15. The semiconductor light emitting device according to claim 11, wherein said ball-up preventive layer includes a Ti layer formed on said substrate and an Ni layer formed on said Ti layer.

20

16. The semiconductor light emitting device according to claim 11, wherein said barrier layer includes a first barrier layer formed on said metal layer, capable of preventing the eutectic material of said bonding layer from intruding into said first electrode, and a second barrier layer formed on or in parallel with said first
25 barrier layer, capable of preventing a composition of a material of said first

electrode from diffusing out from said first electrode.

17. The semiconductor light emitting device according to claim 16, wherein
said first barrier layer is made of an Al/Ta lamination, an Al/Mo lamination or an
5 Al/W lamination and said second barrier layer is made of Ti-W-nitride.

18. The semiconductor light emitting device according to claim 16, wherein
said first barrier layer and said first electrode are patterned in a same shape on
said semiconductor light emitting structure.

10

19. The semiconductor light emitting device according to claim 18, wherein
said second barrier layer has a higher reflectance than a reflectance of said first
electrode, relative to light emitted from said semiconductor light emitting structure.

15 20. The semiconductor light emitting device according to claim 19, wherein
said second barrier layer includes an Al layer in contact with said semiconductor
light emitting structure.